

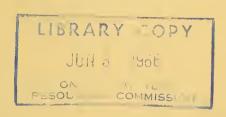
ANNUAL REPORT 1965

BERTIE

water treatment plant

TD 367 .A56 B47 1965 MOE

ENVIONMENT



DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

TD 367 .A56 B47 1965

Bertie: water treatment plant.

81617



ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Bertie Local Advisory Committee, Township of Bertie.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Bertie Water Treatment Plant, OWRC Project No. 59-W-47.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water treatment.

Yours very truly,

D. S. Caverly,

General Manager.



224 BHJ BHJ 1965

OF ER



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

J. A. VANCE, LL.D. CHAIRMAN

J. H. H. ROOT, M.P.P.

D. S. CAVERLY GENERAL MANAGER

W. S. MACDONNELL COMMISSION SECRETARY

General Manager, Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Township of Bertie Water Treatment Plant, OWRC Project No. 59-W-47.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,

Director,

Division of Plant Operations.

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FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng., Director, Division of Plant Operations.

CONTENTS

Foreword	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1
Title Page	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	3
'65 Review	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	4
Glossary	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	5
History	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	6
Project Stat	ff	•	•	•	•	•	•	•	•	•	•	•	•	•	•	7
Description	of	Pro	jed	et	•	•	•	•	•	•	•	•	•	•	•	8
Project Cos	sts	•	•	•	•	•	•	•	•	•	•	•	•	•	•	10
Plant Flow	Cha	ırt	•	•	•	•	•	•	•	•	•	•	•	•	•	13
Design Data	L	•	•	•	•	•	•	•	•	•	•	•	•	•	•	14
Process Da	ta	•				•	•					•	•	•	•	15

BERTIE

water treatment plant

operated for

THE TOWNSHIP OF BERTIE

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M. P. P.

COMMISSIONERS

H. E. Brown W. D. Conklin, Q. C.

D. A. Moodie L. E. Venchiarutti

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

K. H. Sharpe A. K. Watt L. E. Owers

F. A. Voege

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

C. W. Perry Assistant Director:

A. C. Beattie Regional Supervisor: Operations Engineer: P. J. Osmond

801 Bay Street Toronto 5

²65 REVIEW

The Township of Bertie Water Treatment plant operated successfully in 1965 processing a total of 370.56 million gallons of water. A peak daily flow of 2.92 gallons was reached once during the year.

The total operating costs for 1965 were \$42,165.16 for a cost of \$113.79 per million gallons. This is an increase of 7.4% over the 1964 cost permillion gallons and is due partly to increased operating costs and partly to a 2.9% decrease in total plant flow for 1965.

The treated water quality during 1965 was in general better than 1964 reflecting an improvement in raw water turbidities and an increase in the minimum chlorine residual from 0.3 ppm to 0.5 ppm.

GLOSSARY

BTU British Thermal Unit

flocculation bringing very small particles together to form a

larger mass (the floc) before settling

fps feet per second

gpm gallons per minute

lin. ft. linear feet

mgd million gallons per day

pH a symbol for hydrogen-ion concentration; a pH test

determines the intensity of the acidity or alkalinity

of a water

ppm parts per million

ss suspended solids

SWD side wall depth

TDH total dynamic head (usually refers to pressure on a

pump when it is in operation)

turbidity a measurement of the amount of visible material in

suspension in water

HISTORY 1958 - 1965

INCEPTION

In 1958 the Township of Bertie approached the Ontario Water Resources Commission to undertake the design, financing, construction and operation of a water intake, treatment plant and water distribution system.

The firm of Canadian British Engineering Consultants, Toronto, Ontario, was engaged to prepare plans and specifications for the project.

CONSTRUCTION

Construction began in October 1960. Schwenger Construction Company Limited, Burlington, constructed the treatment plant and ancillary works. Dravo of Canada Limited, Toronto constructed the intake and N. J. Storm Limited, Fort Erie the water distribution main. In July 1961, the Division of Plant Operations of the Ontario Water Resources Commission began the operation of the project.

TOTAL COST

\$763,735



W. VYE CHIEF OPERATOR

Project Staff

Operators

J. Huffman

J. Donnelly

C. Birley

E. York

Casual: C. V. Clark

COMMENTS

The staff complement at the Bertie Township plant consists of five regular employees and one casual. There is 24 hour supervision of the plant including both process and equipment.

During 1965, casual operator A. Hallman retired due to ill health. Mr. Hallman had served as a casual since the plant first went into operation. The position is now filled by C. Clark.



Description of Project



REMOVEABLE SCREEN
AT ENTRANCE TO LOW LIFT PUMP WELL

INTAKE WORKS

The intake crib is located 1800 feet out in Lake Erie in approximately seventeen feet of water. The raw waterflows by gravity through a 42 inch diameter corrugated iron pipe laid in a rock cut to the low lift station pump wells.

LOW LIFT STATION

There are two pump wells. Each pump well has a pair of five foot square screens which can be removed separately for cleaning. The screens prevent the entry of debris which might damage the low lift pumps.

The raw water is pumped from the wells

to the microstrainer by three vertical turbine pumps, two of which are located in the east well and one in the west well, with provision for an additional pump in the future.

The pumps are controlled by electrodes located in the clear well of the high lift station. Alow level in the clear well indicates a demand for water.

MICROSTRAINER

Upon reaching the high lift station, the raw water passes through a microstrainer. Amicrostrainer consists of a revolving drum the circumference of which is covered with an extremely fine woven stainless steel cloth. The microstrainer removes most of the algae and other foreign material from the raw water as it passes through the fabric from the inside of the drum to the outside. The strained water then overflows from the microstrainer compartment into an effluent channel which flows into the clear wells. The microstrainer fabric is continually flushed by treated water when in operation and the waste deposits are removed by means of the hollow centre shaft of the unit. Over a period of months accumulations of algae on the fabric which cannot be flushed away must be removed by taking the machine out of service and cleaning with a strong chemical solution.

CHLORINATION

The effluent from the microstrainer is



MICROSTRAINER



WILF VYE ADJUSTS HIGH LIFT PUMP

stored in two clear wells located directly beneath the high lift pumping station. It is here that chlorine is added for disinfection. The chlorine is fed through proportional feed chlorinators the amount being determined by the rate of flow of raw water from the low lift station. Enough chlorine is added to maintain a slight residual in the water when it reaches the consumers outlets.

The chlorine equipment is installed in an isolated room in the high lift pumping station with the chlorine being stored in one hundred and fifty pound cylinders.

DISTRIBUTION

Treated water is drawn from the clear wells and distributed to Bertie Township by four high lift pumps. The downstream pressure is controlled by a butterfly valve operating off a pressure switch. Leaving the plant is a fourteen inch main running north on Rosehill Road to Garrison Road and a twelve inch main running east on Garrison Road from Rosehill Road to Separs Road.

FLOW MEASUREMENT

One 24 inch diameter Dall tube.

PROJECT COSTS

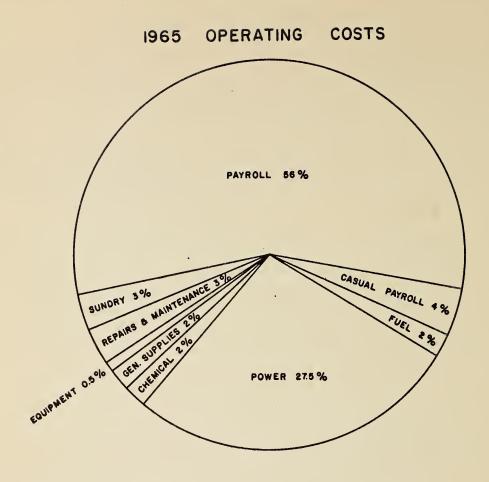
NET CAPITAL COST (Final)	
(Long Term Debt to OWRC)	\$ <u>763,735.45</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965	76, 575. 37
Net Operating	42, 165, 16
Debt Retirement	15,412.00
Reserve	4,659.57
Interest Charges	42,850.92
TOTAL	\$105,087.65
RESERVE ACCOUNT	
Balance at January 1, 1965	20,732.41
Deposited by Municipality	4,659.57
Interest Earned	1, 213. 32
	26, 605, 30
Less Expenditures	1, 100.00
Balance at December 31, 1965	\$ 25,505.30

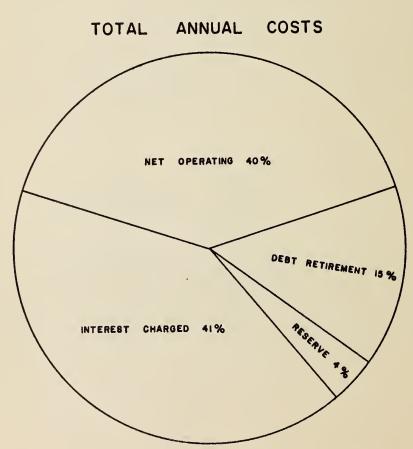
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS B MAINTENANCE	SUNDRY
JAN	[797 . 2]	1704,06	60,00				14.80			18,35
FEB	3066,96	 704 . 06	60.00	170.98	930.43	16.50	47.06		10.00	127.93
MARCH	3256.31	18 82 . 66	69,20	156.58	922,26		40.79	 27 . 00	25.47	32,35
APRIL	3328.93	1989,38	63,60	137.38	913,67	123•75	66.10			35.05
MAY	4049•29	2653,53	142,68	144.78	953,92		50•79		7,06	96,53
JUNE	3102,56	1 769 ₊ 02	205.56	72.18	947.21		34.95	37.39		36,25
JULY	3900 ₀ 80	1 786 . 30	1 37 . 82	14.38	1038.00	215.75	111.85		53,30	
AUG	3502.85	1789.32	282,24	4.78	1090.75	1 23 . 75	64.30	30,22	20.46	97•03
SEPT	3500,42	ı 789 . 32	86,77	4.18	1246.55	123,75	111•71	6.98	110.26	20.90
ост	3962,23	2720,22	296 • 40	5.94	892,67			6 . 55		40,45
NOV	3655•47	1884.10	220.35	25.98	888 62		83•87		511.15	41.40
DEC	5042.13	1836.7	62,40	190,36	1725•26	123.75	136.15	ı 4 . 83	680.04	272,63
TOTAL	42165.16	23508.68	1687.02	927.52	11549.34	727•25	762•37	222.97	1417.74	1362.27

YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER THOUSAND GALLONS
1963	387•069	\$38040.12	\$0.10
1964	381.524	\$40425. 88	\$0.11
1965	370,564	\$42165.16	\$0.11





Technical Section



Process Data

GENERAL

The treatment of water at the Bertie Township plant consists of microstraining to remove algae and gross solids and disinfection by the addition of chlorine.

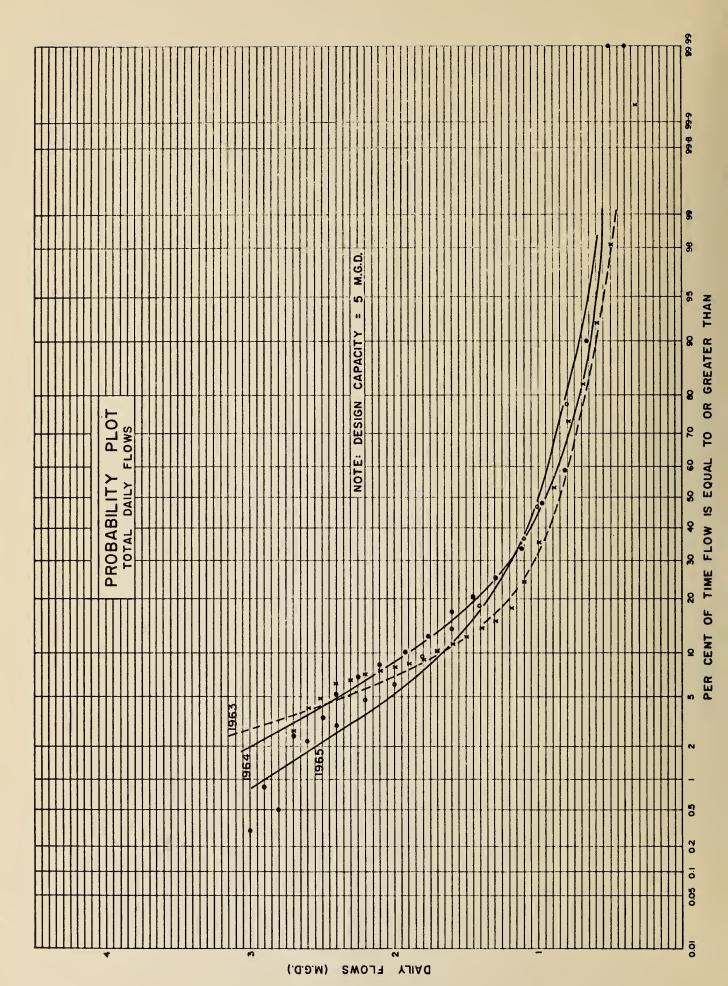
The following data provide information regarding the plant flows, the quality of raw and treated water and the chlorine dosages necessary to maintain safe water.

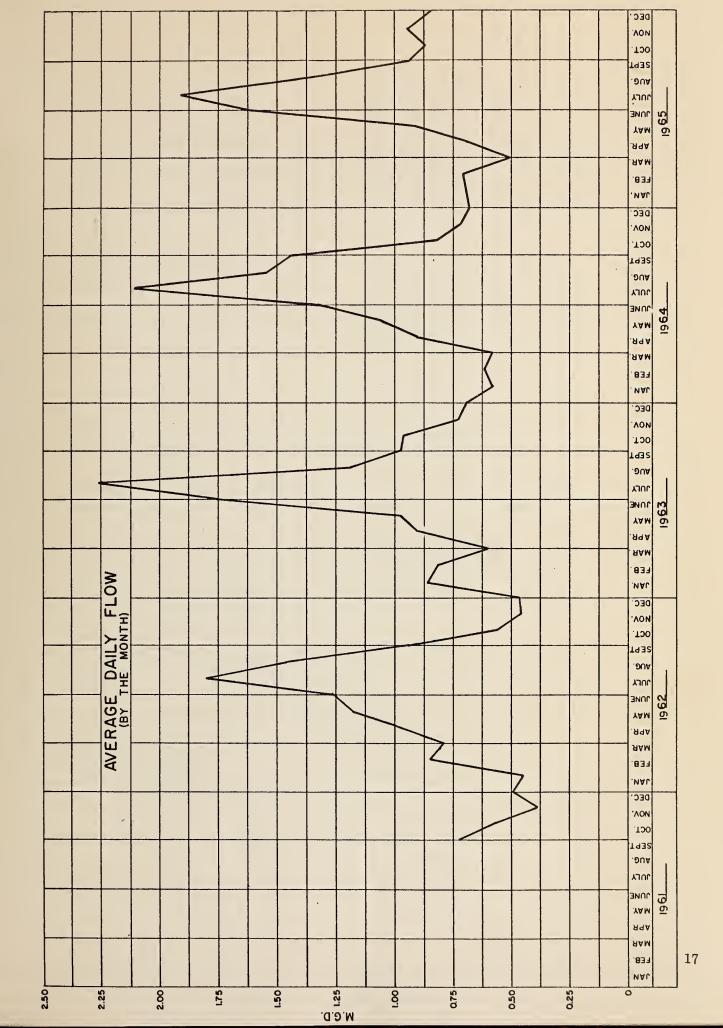
FLOW

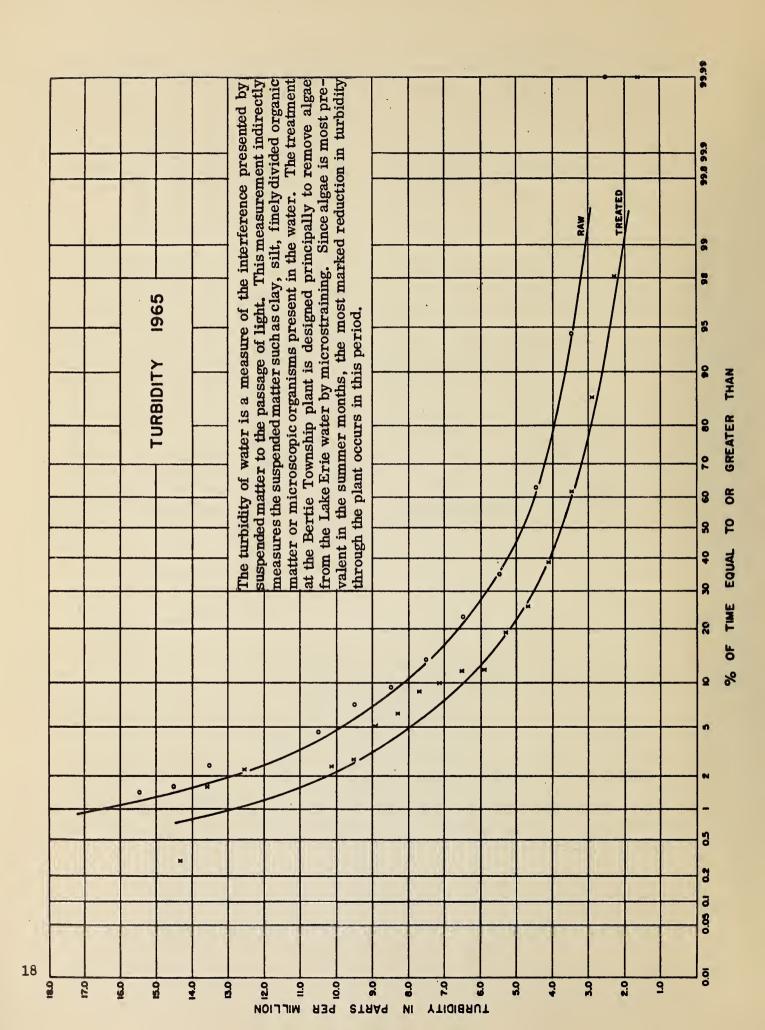
During 1965, a total of 370.56 million gallons of water was supplied to industries and residents in the municipality by the plant. The average daily flow was 1.02 million gallons, down 2.6% from 1964 and the maximum daily flow which occurred on July 1, 1965 was 2.92 million gallons.

Flows once again were characteristically high during June, July and August during the racing and heavy tourist season. Once again the flows during this period were not as high as for the same period in 1963 and 1964 however, there is a trend towards higher average daily flows during the other nine months of the year. The probability plot of total daily flows indicates this feature.

The following two graphs summarize the flow data and provide interesting information on flow trends in Bertie Township.







TURBIDITY

A definition of turbidity may be found on the graph at left. The Ontario Water Resources Commission objective for drinking water suggests a maximum turbidity of 10 ppm. This objective was achieved 98% of the time in 1965. This improved situation reflects a general improvement in raw water turbidities during 1965. Average raw water turbidity in 1965 was 4.8 ppm and 5.4 ppm in 1964.

BACTERIOLOGICAL ANALYSIS

During 1965, a total of 95 samples were submitted to the Ontario Water Resources Commission laboratories for bacteriological analysis. The samples of treated water were taken both from the plant and the distribution system. All of the 72 treated water samples were classified as grade "A" or satisfactory.

CHEMICAL ANALYSIS

During 1965, samples of raw and treated water were analyzed for iron, pH and fluorides. The results of these analysis along with accepted standards for good quality water are shown in the table below.

LOCATION	<u>IRON*</u>	<u>PH</u>	FLUORIDES*
Raw Water	0.33	8.1	0.1
Dist. System North	0.30	7.9	0.1
Dist. System East	0.22	7.9	0.1
Dist. System West	0.24	7.9	0.2
OWRC Water			
Quality Objectives	0.3	6.7 to 8.5	1.0

Note: *measured in (ppm)

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	21. 386	164	0.77
FEBRUARY	19.764	177	0.90
MARCH	20, 261	184	0.91
APRIL	20.607	240	1.16
MAY	28. 190	278	0.99
JUNE	48,499	684	1.41
JULY	59, 309	877	1.48
AUGUST	42.730	603	1.41
SEPTEMBER	28.340	391	1. 38
OCTOBER	26, 536	286	1.08
NOVEMBER	28.482	254	0.89
DECEMBER	26.460	279	1.06
TOTAL	370.564	4417	-
AVERAGE	30.880	368	1, 19

COMMENTS

In May of 1965 the combined chlorine residual was increased from 0.3 to 0.5 ppm. Although this required the consumption of more chlorine, the increased residual provided greater protection against inadequately disinfected water.

A total of 4417 pounds of chlorine was utilized for disinfection during 1965 as opposed to 3936 pounds in 1964. This increase in chlorine consumption is due entirely to the increase of the residual in the treated water.

CONCLUSIONS

There was a decrease in the total flow of treated water from the Bertie Township Water Treatment Plant in 1965. This is due to the decrease in summer demand which was counter balanced in part by an increase in average consumption during the rest of the year.

The quality of treated water in 1965 was to a slight degree better than in 1964. This is due in part to a light decrease in raw water turbidities and in part to an increase in the chlorine residual in the treated water.

There was one major equipment repair in 1965, that being the replacement of the No. 2 high lift pump. The original pump was upon detailed inspection found to be badly worn. At the suggestion of the manufacturer an identical replacement pump was purchased from the Reserve for Contingencies Fund and installed. There was no interruption of service due to

TD227/B47/B47/1965/MOE this repair. ONTARIO WATER RESOURCES COMM. Once again the plant was we DIVISON OF PLANT OPERATIONS ough a well executed preventive ma eplant structure, grounds and equi e close BERTIE WATER TREATMENT PLANT of 1965. In the early part pletely ANNUAL REPORT cleaned and repainted for the n. DATE ISSUED TO ASCH TD Bertie: water treatment plant. 367 81617 .A56 **B47** 1965 Amendment & Amendment Committee PRINCIPLE OF THE PRINCIPLE.



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